First NCI Epidemiology Leadership Workshop: Tobacco, Diet, and Genes

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The Future of Consortia

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“*The business about predicting is difficult, especially when it is about the future*”.

Neils Bohr, 1922 Nobel Laureate in Physics

“*The best way to predict the future is to invent it*”.

Alan Kay, inventor of the laptop, Xerox 1971

The Push-Pull for Epidemiologic Consortia

- Pull
  - Scientific opportunities
  - Era of interdisciplinary (and transdisciplinary) science
  - Opportunities not possible in one institution
- Push
  - High costs and competition for new large studies (e.g., cohorts)
  - Small studies not competitive (not informative)
  - Data sharing

Transdisciplinary Science

- **Multidisciplinary:** coordination of research among different disciplines, e.g. a multi-disciplinary P01 may be a coordinated effort to study a particular cancer issue although individual projects may be discipline-specific.
- **Interdisciplinary:** cooperation of different disciplines on issues that fall between disciplines.
- **Transdisciplinary:** collaborations in which exchanging information, altering discipline-specific approaches, sharing resources, and integrating different disciplines achieves a common scientific goal.

The Future

If we are entering an era of transdisciplinary science, how do we invent it for epidemiology?

Premise

- Epidemiologists like to work with colleagues from their own and other disciplines
- They are good at it because of their world view
- Epidemiology is the study of the distribution and determinants of health-related states and events in populations, and the application of this study to control of health problems (Last)

Prediction

- Epidemiologist will work in consortia if the following conditions are met:
  - There is an opportunity to advance scientific discovery and its application
  - Their careers do not suffer
  - Their universities and places of employment support it
  - There is appropriate financial support

Advancing Science

- Consortia can undertake research not possible in single institutions
- Transdisciplinary science, by crossing disciplinary boundaries, is likely to generate questions not considered within a discipline

Advancing Careers

- Coins of the realm are:
  - first authored publications
  - NIH investigator-initiated research
  - professional recognition
- Largescale collaborations threaten the earning of these coins…or do they?

Academia

- The typical organization of academic institutions fosters the ‘silo mentality’ because of:
  - competition for limited funds
  - disciplinary egos
  - credit given for contributions to departments (not science)
  - indirect cost allocations, etc.
- What does the commonly heard commitment to interdisciplinary science by university leaders really mean?

Money

- Consortial enterprise requires larger amounts of financial commitment over a longer period of time
- Difficult to support with current infrastructure and funding mechanisms

Players

- Universities and other quasi-academic institutions
- Government
- Foundations
- Industry

…*but the rules of the road are not yet clear*

The Cohort Consortium

An example…

Scientific Rationale for Cohort Consortium

- Need for high-quality epidemiologic cohorts with large sample sizes for g-e and g-g interactions
  - subset analyses
  - confirmatory studies
- Coordinated interdisciplinary approach
- Economies of scale
- Speed up research process
- Collaborative network for investigators

New ‘Paradigm’

- Major new challenge for epidemiology
- Exciting opportunities coupled with real concerns: biospecimens, publications, IP
- What’s in it for investigators?
- What is the appropriate roll for the NCI?

The NCI Cohort Consortium

A voluntary consortium of cohort studies of sufficient size or maturity to generate substantial numbers of common cancers and where high quality epidemiologic data and biospecimens have already been collected or are planned for in the near future.

Cohort Consortium First Study
'Proof of Principle'

- Breast and Prostate Cancer and Hormone-related Gene Variants
- PI's – David Hunter, Elio Riboli, Michael Thun, and Brian Henderson

Cohorts Assembled for First Study

Study	Year started	Subjects with blood samples	Breast cancer cases	Prostate cancer cases
EPIC	1992	397,256	2,050	900
ACS (CPS-II)	1998	39,000	500	1,450
ATBC	1991	20,500	-	1,180
HARVARD:				
Physicians HS	1982	20,000	-	1,500
Nurses HS	1989	32,826	945	-
HealthProfS	1993	33,240	-	600
WomenH	1993	28,263	675	-
MultiEthnicC		100,000	1,990	2,400
PLCO	1993	75,000	-	1,000
Total		797,085	6,160	9,030

The Role of the NCI

- Proposed the development of a consortium of existing cohorts
- Made cohort consortium key vehicle for Genes and Environment Extraordinary Opportunity - ByPass Budget FY's 01-04
- Encouraged initial study of Cohort Consortium
- Asked for inclusion of a population genetics component
- Asked for identical RO1s for applications

The Case-Control Consortium follows on the heels of the Cohort Consortium and presents a slightly different model

Is this the right or only way to proceed?

Mechanisms

- RO1s
- PO1s
- Infrastructure grants
- UO1s
- New mechanism???

Where are epidemiologic consortia on the Roadmap?

- **Interdisciplinary Research Implementation Group▪ Interdisciplinary Research (IR) Centers.** Planning grants will be awarded to begin IR programs that will address significant and complex biomedical problems, particularly those that have been resistant to more traditional approaches. Planning activities will include approaches to overcoming traditional institutional barriers to IR, which are intended to lay the foundation and prepare investigators for submitting a subsequent application for support through an IR Consortium. (NIH website)

Who drives the bus?

- Intellectual leadership and direct management best placed in the hands of the extramural investigators:
  - They have the most at stake
  - NCI scientists-both extramural and intramural-are valued partners, key supporters, and critical to generating the appropriate research mechanisms
  - It fits best with sound NIH principles of review and support

Application

- A more steady eye on road and where it leads is needed
- The value of consortia that are led by epidemiologists, or which they participate, must be clear to funders, government and the public
- The dissemination of results from the large investment that consortia require is critical

The Future

- Transdisciplinary research and consortia likely to be more common
- Must be driven and led by extramural investigators
- Collaboration across boundaries - academia, government, industry
- Critical need for revision in the academic reward system for intellectual input to scientific infrastructure and collaborative enterprises
- Society (and funders) will require more attention to translation and dissemination

FIN

Local example in San Francisco Bay Area

- Area rich in talent and resources
- Currently no large population cohort
- Potential collaborators include UCSF, KP, LBNL, UCB, Stanford, NCCC
- Options:
  - Collaboration with non-Bay Area investigators
  - Build cohort de novo
  - Build from existing Kaiser Permanente member population and collaborative relationships in place